



Ambient temperature and mortality: An international study in four capital cities of East Asia

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Abstract:

Extreme ambient temperature has been associated with increased daily mortality across the world. We describe the ambient temperature-mortality association for four capital cities in East Asia, Seoul, Beijing, Tokyo, and Taipei, and identify a threshold temperature for each city and the percent increase in mortality. We adapted generalized linear modeling with natural cubic splines (GLM+NS) to examine the association between daily mean apparent temperature (AT) and total mortality, as well as mortality due to respiratory (RD) and cardiovascular (CVD) causes in a threshold model. We conducted a time-series analysis adjusting for day of the week and long-term time trend. The study period differed by city. The threshold temperature for all seasons was estimated to be 30.1-33.5 degrees C, 31.3-32.3 degrees C, 29.4-30.8 degrees C, and 25.2 degrees -31.5 degrees C for Seoul, Beijing, Tokyo, and Taipei, respectively, on the same day. For the mean daily AT increase of 1 degrees C above the thresholds in Seoul, Tokyo, and Taipei, estimated percentage increases in daily total mortality were 2.7 (95% confidence interval (CI)Euro Surveillance (Bulletin European Sur Les Maladies Transmissibles; European Communicable Disease Bulletin)2.2-3.1), 1.7 (95% CIEuro Surveillance (Bulletin European Sur Les Maladies Transmissibles; European Communicable Disease Bulletin)1.5-2.0), and 4.3 (95% CIEuro Surveillance (Bulletin European Sur Les Maladies Transmissibles; European Communicable Disease Bulletin)2.9-5.7), respectively. Beijing provided no total mortality counts. Estimated percentage increases were 2.7-10.5 for RD mortality, 1.1-9.3 for CVD mortality in 4 cities. This study identified increased mortality due to exposure to elevated AT. The importance of effects of AT and city-specific threshold temperatures suggests that analyses of the impact of climate change should take regional differences into consideration.

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Resource Description

Exposure : ☑

weather or climate related pathway by which climate change affects health

Meteorological Factors, Temperature

Temperature: Extreme Heat

Geographic Feature: ☑

resource focuses on specific type of geography

Climate Change and Human Health Literature Portal

Ocean/Coastal, Urban

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: China, Other Asian Country

Other Asian Country: South Korea; Japan; Taiwan

Health Impact:

specification of health effect or disease related to climate change exposure

Cardiovascular Effect, Morbidity/Mortality, Respiratory Effect

Cardiovascular Effect: Other Cardiovascular Effect

Cardiovascular Disease (other): cardiovascular mortality

Respiratory Effect: Other Respiratory Effect

Respiratory Condition (other) : respiratory mortality

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type:

format or standard characteristic of resource

Research Article

Resilience:

capacity of an individual, community, or institution to dynamically and effectively respond or adapt to shifting climate impact circumstances while continuing to function

A focus of content

Timescale:

time period studied

Time Scale Unspecified